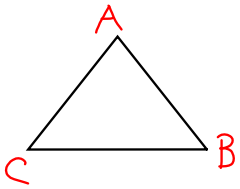
5.4 The Triangle Inequality

Thm. 5.11--<u>The triangle inequality theorem</u>--the sum of the lengths of any 2 sides of a triangle is greater than the length of the 3rd side.

$AB + BC > AC$

$AB + AC > CB$

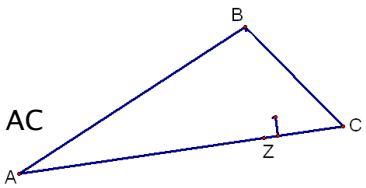
$AC + BC > AB$



Let's Prove it.

Given: ΔABC

Prove: $AB + BC > AC$



Do the lengths represent a triangle?

4, 5, 7 yes

$9 > 7$ ✓

13, 12, 20 yes

$25 > 20$

7, 14, 21 no

$21 = 21$

7, 7, 7 yes

$14 > 7$

8, 8, 19 no

Two sides of a triangle are 6 and 11.
What is the range of the 3rd side?

$5 < x < 17$

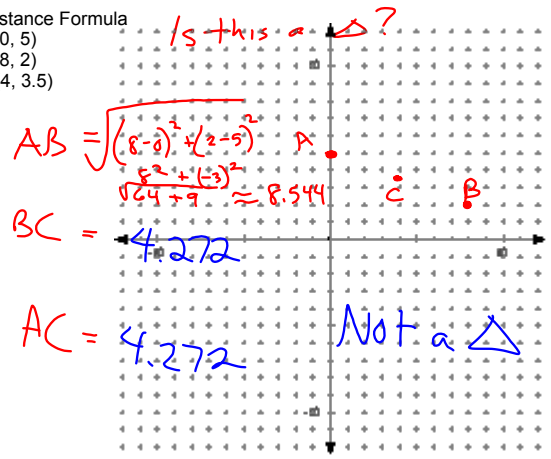
$11 - 6 = 5$ $\quad$ $11 + 6 = 17$

Two sides of a triangle are 12 and 18.
What is the range of the 3rd side?

$18 - 12 = 6$ $\quad$ $12 + 18 = 30$

$6 < x < 30$

Distance Formula
A(0, 5)
B(8, 2)
C(4, 3.5)



$AB = \sqrt{(8-0)^2 + (2-5)^2}$

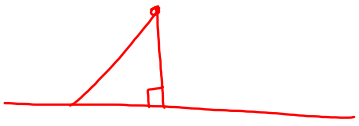
$\sqrt{64+9} \approx 8.544$

$BC = 4.272$

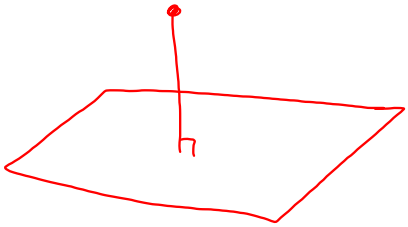
$AC = 4.272$

Not a △

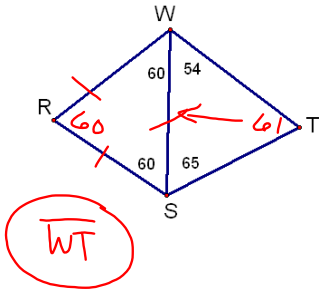
Thm 5.12--Shortest distance from a point to a line is a perpendicular segment



Corollary 5.1--shortest distance from a point to a plane is a perpendicular segment

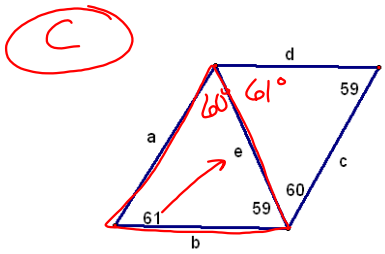


What is the longest segment?



$\overline{WT}$

What is the longest segment?



$e > b > a$ $\quad c > d > e$

HW
p264-265
15-35odd, 38,41, 43